

TEST REPORT
(시험성적서)

신청기관 (인) : (주)엠케이캠애펙
APPLICANT : MK Chem & Tech Co., Ltd.
주소 (한글) : 경기도 안산시 단원구 원시로 71
ADDRESS (ENGL.) : 71, Wonsi-ro, Danwon-gu,
Ansan-si, Gyeonggi-do, Korea

발행면수 (PAGE) : 1 of 12
발행일자 (DATE) : 2023. 06. 26.

시험성적서 번호 (REPORT NO.) : RT23R-S3844-015-K

시료 명세 (SAMPLE DESCRIPTION) : 시료에 대한 상세한 정보는 아래와 같음
(The following submitted sample(s) said to be)

제품명/형식 (NAME/TYPE OF PRODUCT) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)

시료고유번호 (SAMPLE ID NO.) : RT23R-S3844-015
(RT23R-S3844-015)

제품 생산자/공급자 (MANUFACTURER/VENDOR) : (주)엠케이캠애펙
(MK Chem & Tech Co., Ltd.)

시료접수일자 (SAMPLE RECEIVED) : 2023. 06. 19.
(Jun. 19, 2023)

시험일자 (TESTING DATE) : 2023. 06. 19. ~ 2023. 06. 26.
(Jun. 19, 2023 ~ Jun. 26, 2023)

시험방법 (TEST METHOD) : 이 시험성적서의 다음 페이지 첨부
(Please see the following page)

시험결과 (TEST RESULT) : 이 시험성적서의 다음 페이지 첨부
(Please see the following page)

비고 (Notes) : 1. 이 시험성적서는 제시된 시료 및 시료명으로 시험한 결과로서 유사 대상시료에 적용할 수 없음.
(The test results presented in this report refer only to the object tested.)
2. 이 시험성적서는 승인없이 복사 사용을 금함.
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승인자 (Approved by)



장준용/기술책임자
(Jade Jang / Lab. Technical Manager)

권한자 (Authorized by)



박병욱/소장
(Bo Park / Lab. General Manager)



Authenticity check



TEST REPORT
(시험 성적서)

발행면수 (PAGE) : 2 of 12
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시험성적서 번호 (REPORT NO.) : RT23R-S3844-015-K
시료고유번호 (SAMPLE ID NO.) : RT23R-S3844-015
시료명 (SAMPLE DESCRIPTION) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)

시험항목 (TEST ITEM)	단위 (UNIT)	분석방법 (TEST METHOD)	검출한계 (MDL)	시험결과 (RESULT)
카드뮴 (Cadmium, Cd)	mg/kg	With reference to IEC 62321-5 Edition 1.0 : 2013, by acid digestion and determined by ICP-OES	0.5	N.D.
납 (Lead, Pb)	mg/kg		5	N.D.
수은 (Mercury, Hg)	mg/kg	With reference to IEC 62321-4 : 2013/AMD1 : 2017, by acid digestion and determined by ICP-OES	2	N.D.
6가 크롬 (Hexavalent Chromium, Cr ⁶⁺)	mg/kg	With reference to IEC 62321-7-2 Edition 1.0 : 2017, by alkaline/toluene digestion and determined by UV-VIS Spectrophotometer	8	N.D.
폴리브로모화비페닐 (Polybrominated Biphenyls, PBBs)				
모노브로모비페닐 (MonoBB)	mg/kg	With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS	5	N.D.
다이브로모비페닐 (DiBB)	mg/kg		5	N.D.
트라이브로모비페닐 (TriBB)	mg/kg		5	N.D.
테트라브로모비페닐 (TertaBB)	mg/kg		5	N.D.
펜타브로모비페닐 (PentaBB)	mg/kg		5	N.D.
헥사브로모비페닐 (HexaBB)	mg/kg		5	N.D.
헵타브로모비페닐 (HeptaBB)	mg/kg		5	N.D.
옥타브로모비페닐 (OctaBB)	mg/kg		5	N.D.
노나브로모비페닐 (NonaBB)	mg/kg		5	N.D.
데카브로모비페닐 (DecaBB)	mg/kg		5	N.D.
폴리브로모화디페닐에테르 (Polybrominated Diphenyl Ethers, PBDEs)				
모노브로모디페닐에테르 (MonoBDE)	mg/kg	With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS	5	N.D.
다이브로모디페닐에테르 (DiBDE)	mg/kg		5	N.D.
트라이브로모디페닐에테르 (TriBDE)	mg/kg		5	N.D.
테트라브로모디페닐에테르 (TetraBDE)	mg/kg		5	N.D.
펜타브로모디페닐에테르 (PentaBDE)	mg/kg		5	N.D.
헥사브로모디페닐에테르 (HexaBDE)	mg/kg		5	N.D.
헵타브로모디페닐에테르 (HeptaBDE)	mg/kg		5	N.D.
옥타브로모디페닐에테르 (OctaBDE)	mg/kg		5	N.D.
노나브로모디페닐에테르 (NonaBDE)	mg/kg		5	N.D.
데카브로모디페닐에테르 (DecaBDE)	mg/kg		5	N.D.

Tested by : Jooyeon Lee, Chano Kim, Hayan Park

Notes : mg/kg = ppm = parts per million (함량 표시 : 백만분의 일)
< = Less than (결과 값 이하)
N.D. = Not detected (< MDL, 미검출 - 검출한계 이하)
MDL = Method detection limit (검출한계)



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(시험 성적서)

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시험성적서 번호 (REPORT NO.) : RT23R-S3844-015-K

시료고유번호 (SAMPLE ID NO.) : RT23R-S3844-015

시료명 (SAMPLE DESCRIPTION) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)

시험항목 (TEST ITEM)	단위 (UNIT)	분석방법 (TEST METHOD)	검출한계 (MDL)	시험결과 (RESULT)
브롬 (Bromine, Br)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
염소 (Chlorine, Cl)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
베릴륨 (Beryllium, Be)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
안티몬 (Antimony, Sb)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
헥사브로모시클로도데칸 (Hexabromocyclododecane, HBCDD)	mg/kg	With reference to IEC 62321-9 : 2021, by solvent extraction and determined by LC/MS and GC/MS	10	N.D.
비스페놀 에이 (Bisphenol A, BPA)	mg/kg	With reference to US EPA 3550C, determined by LC/MS or LC/MS/MS	1	N.D.
퍼플루오로옥타노익에시드 (Perfluorooctanoic acid, PFOA)	mg/kg	With reference to DIN CEN/ TS 15968, by ultrasonic extraction and determined by LC/MS or LC/MS/MS	0.025	N.D.
퍼플루오로옥탄설포네이트 (Perfluorooctane sulfonate, PFOS)	mg/kg	With reference to DIN CEN/ TS 15968, by ultrasonic extraction and determined by LC/MS or LC/MS/MS	0.025	N.D.

Tested by : Chano Kim, Jooyeon Lee, Hayan Park

Notes : mg/kg = ppm = parts per million (함량 표시 : 백만분의 일)
 < = Less than (결과 값 이하)
 N.D. = Not detected (< MDL, 미검출 - 검출한계 이하)
 MDL = Method detection limit (검출한계)



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시료고유번호 (SAMPLE ID NO.) : RT23R-S3844-015

시료명 (SAMPLE DESCRIPTION) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)

시험항목 (TEST ITEM)	CAS번호 (CAS NO.)	단위 (UNIT)	분석방법 (TEST METHOD)	검출한계 (MDL)	시험결과 (RESULT)
디부틸프탈레이트 (Dibutyl phthalate, DBP)	84-74-2	mg/kg	With reference to IEC 62321-8 Edition 1.0 : 2017, by solvent extraction and determined by GC/MS	50	N.D.
디에틸헥실프탈레이트 (Di-(2-ethylhexyl) phthalate, DEHP)	117-81-7	mg/kg		50	N.D.
디엔옥틸프탈레이트 (Di-n-octyl phthalate, DNOP)	117-84-0	mg/kg		50	N.D.
디이소노닐프탈레이트 (Diisononyl phthalate, DINP)	28553-12-0 68515-48-0	mg/kg		100	N.D.
디이소데실프탈레이트 (Diisodecyl phthalate, DIDP)	26761-40-0 68515-49-1	mg/kg		100	N.D.
벤질부틸프탈레이트 (Benzyl butyl phthalate, BBP)	85-68-7	mg/kg		50	N.D.
디이소부틸프탈레이트 (Diisobutyl phthalate, DIBP)	84-69-5	mg/kg		50	N.D.
디엔헥실프탈레이트 (Di-n-hexyl phthalate, DNHP)	84-75-3	mg/kg		50	N.D.

Tested by : Hayan Park

Notes : mg/kg = ppm = parts per million (함량 표시 : 백만분의 일)
< = Less than (결과 값 이하)
N.D. = Not detected (< MDL, 미검출 - 검출한계 이하)
MDL = Method detection limit (검출한계)

Intertek Testing Services Korea Ltd.

Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0025 Web Site : intertek.co.kr

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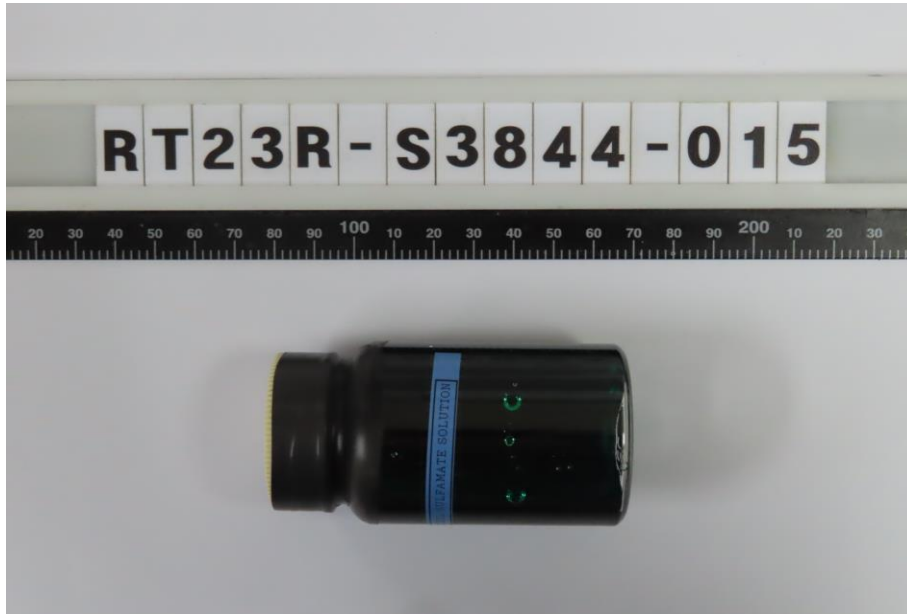
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시험성적서 번호 (REPORT NO.) : RT23R-S3844-015-K

시료고유번호 (SAMPLE ID NO.) : RT23R-S3844-015

시료명 (SAMPLE DESCRIPTION) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)

* 시료 접수 시 시료 상태 :
(View of sample as received)



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(시험성적서)

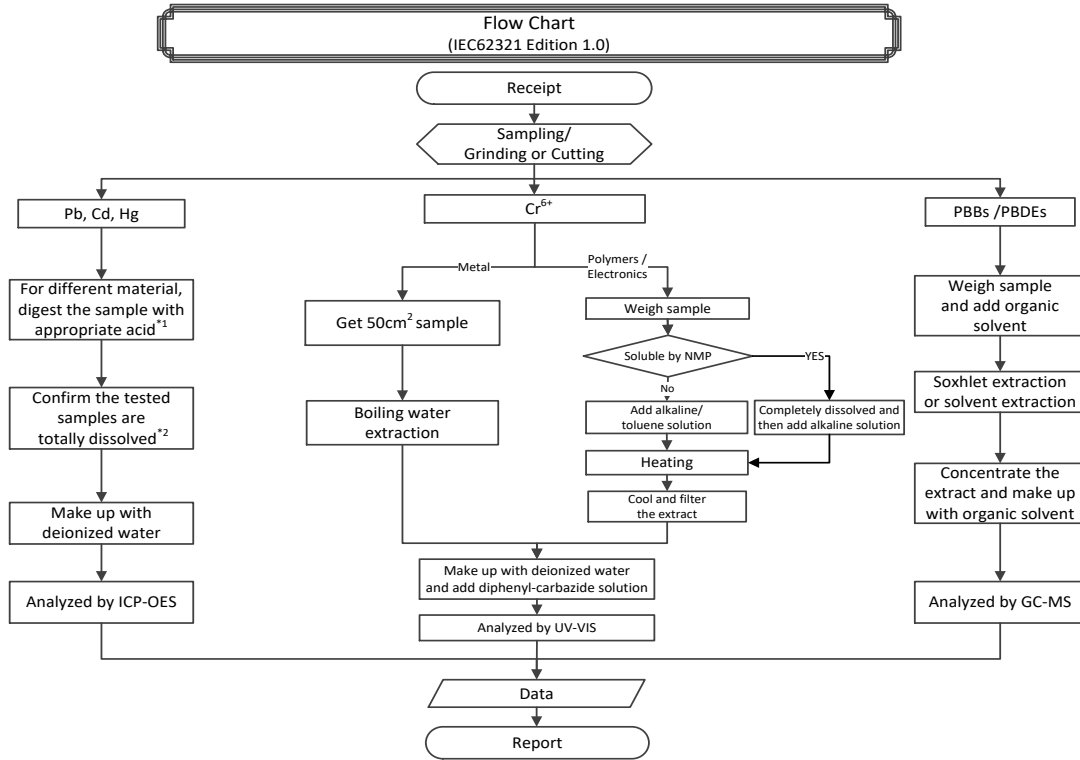
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시료고유번호 (SAMPLE ID NO.) : RT23R-S3844-015

시료명 (SAMPLE DESCRIPTION) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)



Remarks :

*1 : List of appropriate acid :

Material	Acid added for digestion
Polymers	HNO ₃ , HCl, HF, H ₂ O ₂ , H ₃ BO ₃
Metals	HNO ₃ , HCl, HF
Electronics	HNO ₃ , HCl, H ₂ O ₂ , HBF ₄

*2 : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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(시험 성적서)

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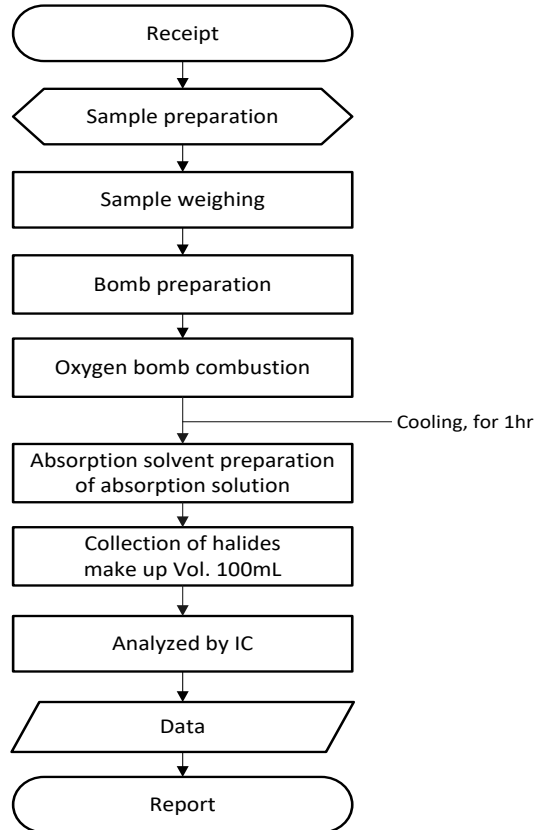
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Flow Chart (EN14582)



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TEST REPORT (시험성적서)

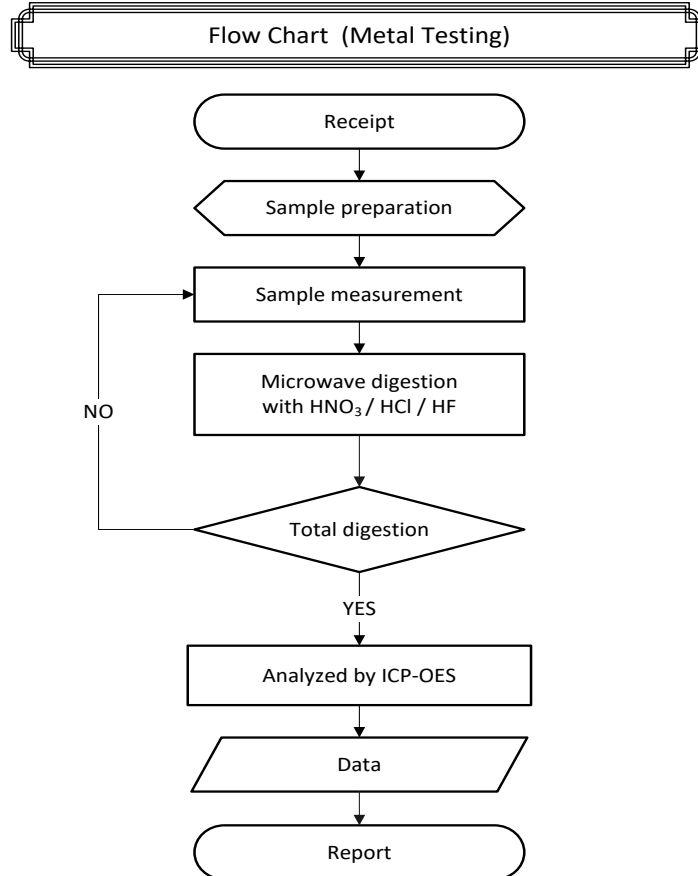
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시료명 (SAMPLE DESCRIPTION) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)



** 비고 : 이 샘플은 위의 흐름도에 따른 전처리 방법에 의해 완전용해 되었음.
(The samples were dissolved totally by pre-conditioning method according to above flow chart.)



TEST REPORT (시험 성적서)

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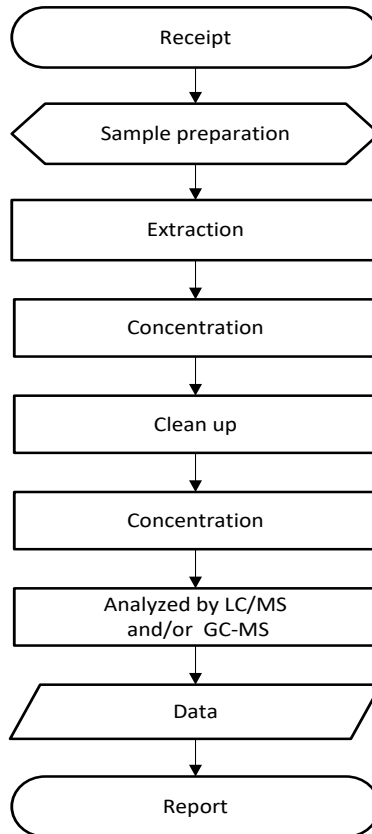
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Flow Chart (HBCDD)



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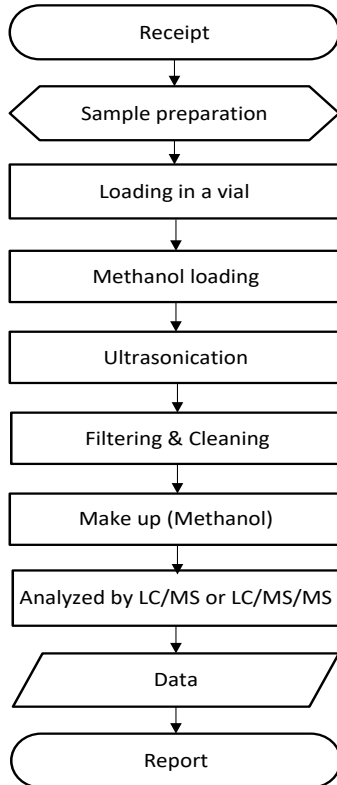
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Flow Chart (PFOS, PFOA)



TEST REPORT (시험 성적서)

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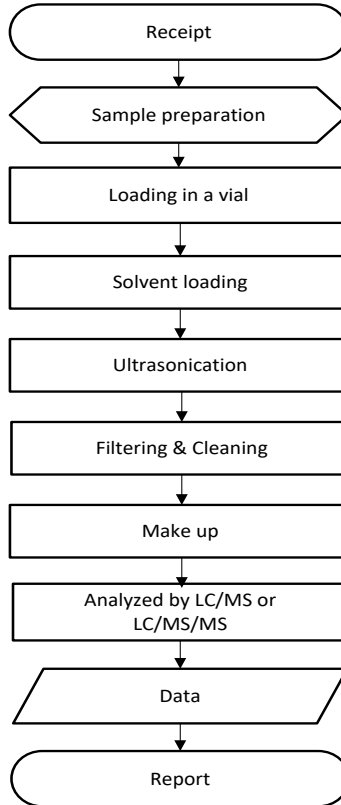
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Flow Chart (BPA)



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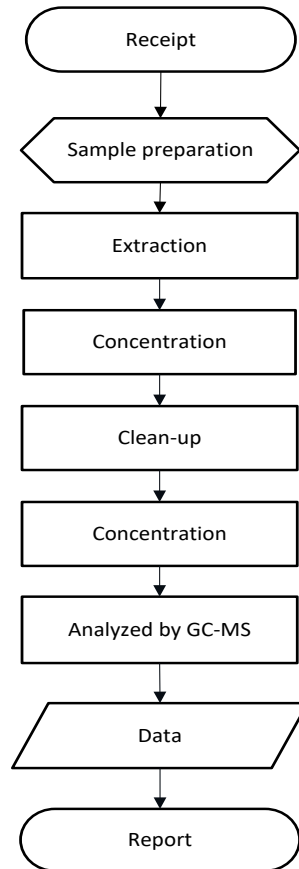
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시료명 (SAMPLE DESCRIPTION) : NICKEL SULFAMATE SOLUTION
(NICKEL SULFAMATE SOLUTION)

Flow Chart (Phthalates)



***** End of Report *****

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